Transenella stimpsoni Dall. Moraine Cay.
Tivela abaconis Dall. Moraine Cay.
Venus listeri (Gray). Marsh Harbor.
Venus cancellata Linn. Riding Point, Grand Bahama Island; Hopetown; Moraine Cay; dredged in Whale Cay Channel and at other localities northeast of Great Abaco Island; Fortune Island and High Rock, Grand Bahama Island (Utowana).
Venus grus (Holmes). Whale Cay Channel.
Venus pygmaea Lam. Mangrove Cay; Lake Cunningham, New Providence.
Venus paphia Linn. Whale Cay Channel.
Petricola lapicida (Gmel.). Mangrove Cay.
Ervilia subcancellata Smith. Mangrove Cay; Moraine Cay; Hopetown; Whale Cay Channel.
Heterodonax bimaculata (Linn.). Strangers Cay; Mangrove Cay.
Asaphis deflorata (Linn.). Mangrove Cay; Marsh Harbor.
Tagelus divisus (Spengl.). Moraine Cay; dredged in Whale Cay Channel and at other localities northeast of Great Abaco.
Semele bellastriata (Conr.). Moraine Cay; dredged in Whale Cay Channel and at other localities northeast of Great Abaco Island.
Tellina interrupta Wood. Marsh Harbor.
Tellina radiata Linn. Lake Cunningham, New Providence; Marsh Harbor.
Tellina martinicensis d'Orb. Moraine Cay.
Tellina sayi 'Deshayes' Dall. Whale Cay Channel.
Tellina promera Dall. Dredged in Whale Cay Channel and at other localities northeast of Great Abaco Island.
Tellina iris Say. Whale Cay Channel.
Tellina candeana Orb. Mangrove Cay.
Strigilla flexuosa (Say). Moraine Cay.
Pandora arenosa Conrad. Moraine Cay.
Cuspidaria perrostrata Dall. Inside the keys north of the Abacos.

COMPARATIVE STUDIES OF LOESS AND RECENT MOLLUSKS. II

BY B. SHIMEK

2. Polygyra multilineata (Say).

This species is even more variable in size and color than *P. profunda,* in both fossil and recent faunas. This has given rise to a number of varietal names.

It now extends from northeastern Kansas northward to eastern Nebraska and eastward across Iowa and southern Minnesota to western New York.

In the loess it ranges from Iowa to Arkansas and from southwestern Indiana to eastern Nebraska, thus coinciding quite closely with the present distribution, excepting in the east where there is no loess.

It also varies somewhat in habitat. The usual larger form (approaching or embracing the type) is usually found in rather low alluvial woods, even where subject to annual inundation, favoring particularly the places occupied by the soft maple (*Acer saccharinum* L.) and its associates. It may, however, also extend to higher ground where it grades into a form approaching the smaller form known as *var. algonquinensis* of Nason.

The latter seems to extend chiefly through the prairie region from northern Illinois and southern Wisconsin through northern Iowa and southern Minnesota to eastern Nebraska, in which it usually inhabits the thickets or groves which border the margins of prairie swamps—less frequently entering similar emerging places within the swamp itself. In the portion bordering the Mississippi and Missouri Rivers, however, this form grades into the larger type.

The variation in color is also great in the recent forms. The shell varies from a very light horn color to a deep brownish red, and it is usually marked by numerous unequal lines, often blended into broader bands, and varying greatly in number, which may appear on all parts or the shell, or on the upper or lower side alone, or only on the apical whorls or the body whorl. Unicolored forms are frequent, especially in the smaller variety. These have received the names *var. alba* and *var. rubra.* The various color-patterns intergrade completely, however, and moreover do not represent distinct ecological conditions and are mere variants unworthy of special rank.

The fossils, especially the larger forms, often show the color lines, but rather more frequently they are unicolored, in some cases probably as a result of complete bleaching.

Several varietal names, based chiefly on size, have been proposed. Of these *var. algonquinensis* Nason (Nautilus, **19**: 141;

1906), the recent smaller form, is probably most deserving of varietal rank as it represents an ecological condition, but it also blends perfectly with the typical form, and in any larger series there will always be specimens which cannot be placed definitely.

There is, however, less excuse for two more recent varietal names, namely *wanlessi* and *altonensis.*

Var. *wanlessi* F. C. Baker (NAUTILUS, **41**: 132; 1928). This was based on the smaller form of *P. multilineata* which is the common representative of the species in northern loess. It was said to differ from *algonquinensis* in its larger size, more gibbous whorls, especially the body-whorl, and the deeper indentation of the umbilical region.

The greatest diameter was given as 18.5 to 21.5 mm., but the same author (*ibid.* **36**: 21, 1922) had previously recorded the same dimension of *var. algonquinensis* as 18.5–22.0 mm.!

Later the same author (1929, p. 295) somewhat modified the description as follows: "The fossil variety differs (from *algonquienensis*) in having a deeply impressed umbilical region and in being widely perforated, characteristics lacking in the recent variety. The fossil form ranges both larger and smaller than *algonquinensis* but is on the whole somewhat larger and in many examples has a more depressed spire."

Still later (Jour. of Paleontology **5**: 273; 1931) he calls it a "race," and has it differ from *algonquinensis* "in its larger size, smaller, less rounded aperture," and in sculpture being "much coarser." The dimensions of six shells, each, of "*wanlessi*" and "*algonquinensis*" are given the following range in dimensions:

	Gr. diam.	*Height*
"*Wanlessi*"	21.5–15.1 mm.	14.9–9.0 mm.
"*Algonquinensis*" ...	19.3–16.5	8.0–5.2

In the original description of the latter, Nason (*ibid.*) reported 223 shells ranging from 19 to 17 mm. in diameter, and 61 which extended beyond these limits from 21.0 to 14.5 mm.

The following table shows that, with one exception, the recent and fossil shells of the smaller form show essentially the same range in dimensions. The exception, the Henderson Co., Ill.,

fossil set, has both extremes lower, but the majority of its shells falls within the limits of the remaining sets.

It will also be noted that the dimensions given in the table embrace all the dimensions noted above.

Locality	*No. meas.*	*Gr. diam.*	*Height*	*No. of whorls*
"Algonquinensis" (recent)				
Iowa City, Ia.	153	23.0–15.5 mm.	15.0–11.0 mm.	5.4–4.8
Mason City, Ia.	637	21.0–14.0	14.5– 9.5	5.2–4.7
Council Bluffs, Ia.	38	20.5–16.5	14.0–11.0	5.3–4.8
E. Nebraska (3 loc.)	79	23.0–16.0	14.5–11.5	5.5–5.1
"Wanlessi" (fossil)				
Fulton Co., Ill.	186	22.5–15.0	13.5– 9.0	5.3–4.8
Cass Co., Ill.	159	22.0–15.0	14.0– 9.5	
Henderson Co., Ill.	66	18.5–11.5	11.5– 7.0	5.0–4.3
St. Joseph, Mo.	86	21.5–14.0	14.5–10.0	5.6–5.0
Iowa City, Ia.	30	23.5–12.0	15.0– 8.5	5.2–4.5
Council Bluffs, Ia.	26	20.0–13.5	13.0–10.0	5.3–5.0
E. Nebraska (4 loc.)	38	21.5–12.5	14.0–10.0	5.2–4.7

It is therefore evident that size does not distinguish the recent and fossil forms of this series.

The other characters noted in F. C. Baker's several descriptions of *"wanlessi"* are equally devoid of value.

The gibbosity of the body-whorl, the indentation of the umbilical region, the size and shape of the aperture, and the depression of the spire, are equally variable in the fossil and recent forms, as shown in large series of both, and they cannot be recognized as distinguishing characters. The same is true of the umbilicus.

How worthless the umbilicus is as a distinguishing character in this case is shown in the following table giving the number of shells with closed and open umbilicus in each set—fossil and recent.

The first fossil set, marked Lewistown, was obtained from two cuts respectively 4.5 and 3.5 mi. southeast of Lewistown, Illinois. This is in the region from which types of *"wanlessi"* were

obtained—"Fulton County, Illinois, east of Havana" (evidently a misprint, as Fulton County is west of Havana) the second set was collected two miles south of Chandlerville, about 21 miles south of Havana. Both evidently include the type forms of "*wanlessi.*" The remaining fossil sets are manifestly the same form from western localities.

The recent sets represent "*var. algonquinensis.*"

Fossil			*Recent*		
Locality	*Closed*	*Open*	*Locality*	*Closed*	*Open*
Lewistown, Ill. ...	111	65	Iowa City, Ia.	150	7
Chandlerville, Ill.	109	52	Mason City, Ia.....	614	91
Iowa City, Ia.	25	11	Council Bluffs, Ia.	41	4
Council Bluffs, Ia.	38	5	Bellevue, Neb.	24	7
Hamburg, Ia.	26	0	West Point, Neb.	39	2
Omaha, Neb.	24	10			
St. Joseph, Mo. ...	145	10			

In most of the shells with open umbilicus the latter is reduced to a mere slit. In the first two fossil sets (from the type region) most of the 117 umbilicated shells show a mere slit, and only 8 could be described as "widely perforate," and in some of these it is quite evident that the callus was broken. The modern shells also occasionally show a wide umbilicus, but in both cases the shells are probably not quite mature—which is also suggested by the usually narrow reflexed lip.

The original description of "*wanlessi*" is also accompanied by the statement that the "immature shells appear to be always umbilicated." As this is true of *all Polygyras,* including those which have a closed umbilicus at maturity, it scarcely constitutes a distinguishing character!

The last remaining character, the coarseness of the sculpture, is quite as worthless. The ribs which cross the whorls vary greatly in size, etc., not only in different shells, but often on the same shell. Some are fine, others coarser; some are incomplete and some forked; those on one part of the shell may be fine, and on another quite coarse; sometimes the fine and coarse ribs alternate irregularly; and the ribs may be rather sharp, or (more fre-

quently) they may be rounded, or they may have a longitudinal groove along the crest. Only rather rarely are they quite regular. All this applies to both fossil and recent forms.

The number is also variable, even on different parts of the same shell. The following table gives the variation in number of ribs per unit of 3 mm. The first column gives this number for the body whorl, and the second column for the second whorl.

No. of ribs per each 3 mm.

Fossil (wanlessi)	*Body-whorl*	*Second whorl*	*Recent (algonquinensis)*	*Body-whorl*	*Second whorl*
Fulton Co., Ill. ...	7–13	10–13	Mason City, Ia. ...	8–10	11–13
Cass Co., Ill.	8–10	10–12	Bellevue, Neb.	7–10	7–12
St. Joseph, Mo. ...	7–10	9–14	West Point, Neb.	7–11	9–14
Council Bluffs, Ia.	8–10	10–12	Council Bluffs, Ia.	7–10	10–14
Iowa City, Ia.	8–13	11–15	Iowa City, Ia.	6–11	10–13

Usually the larger shells or larger whorls have fewer and coarser ribs.

Sculpture manifestly does not differentiate the fossil as a variety.

In all essential characteristics "*wanlessi*" and "*algonquinensis*" are alike, and if this smaller variant of *P. multilineata* is to be recognized at all, it should bear the latter varietal name. There is no valid reason for recognizing "*wanlessi.*" It was evidently set apart merely because it is a fossil, and it has been repeatedly reported as extinct because of a lack of full understanding of the modern molluscan fauna of the general prairie region embracing the northern loess.

Var. *altonensis* F. C. Baker (NAUTILUS, **34**: 65; 1920). This was based on the following deviations from the type, which were observed in four fossil shells from Alton, Illinois: Shell larger; whorls more gibbous; spire more depressed; suture between later whorls more deeply impressed; rapidly descending last whorl; heavier reflected lip and umbilical callus; spiral color lines apparently much less numerous. That size was considered an important character is shown by the further statement that "this form of *multilineata* is so uniformly different from the usual

form and size of this species that it seems to require a special designation''; and that the ''greater size and gibbous-shaped whorls are sufficiently characteristic to cause its immediate recognition.'' The following dimensions of two shells, apparently the extremes of the small set, were given:

Gr. diam.	*Height*	*Aperture height*	*Aperture breadth*
32 mm.	19.5 mm.	14 mm.	14 mm.
28	15.5	11	12

Later (Jour. of Paleontology **5**: 273, 1931) the same writer practically repeated the original description with only minor modifications.

Size, again, seems to be the major factor. The present writer has collected several sets of this large fossil form from the loess, two of them from Alton, Ill., the type locality. A fine set was also collected at Helena, Ark., in 1907. This originally contained 46 shells, but a few were broken and some were sent to correspondents.

The following table gives the dimensions of the extremes of each set. The fossils marked Alton (a) are from the type exposure. Those marked Alton (b) are from the ''pink'' loess at Market and E. 6th streets. The latter set contains 13 additional broken shells ranging from 30 to 25 mm. in gr. diam.

The two large recent shells reported by F. M. Witter were originally a part of the other (large) Muscatine set, but they were evidently burned in the Muscatine High School fire in 1896. The first was published in 1878 (Quar. Jour. of Conch. **1**: 384) and the second in 1883 (The Mollusca of Muscatine County and Vicinity, 6). Witter at first reported 25 mm. as the smallest diameter, but later added much smaller shells from the same bottomland. The set is now in the writer's collection.

The intergradation between each of the four locality sets is perfect at least to the mm.

The aperture in Witter's specimens was probably somewhat larger than that of the largest shell now in the writer's possession.

Locality	No. of spec.	Gr. diam.	Height	Aperture	
				Height	Width
Fossil					
Baker's types	4	32.0 mm.	19.5 mm.	14 mm.	14 mm.
		28.0	15.5	11	12
Alton, Ill. (a)	2	29.0	.....	11	12
		28.5	19.5	11	12
Alton, Ill. (b)	3 (+13)	28.0	19.0		
		25.5	16.0		
Helena, Ark.	20	32.0	21.6	13	14
		24.5	15.0	9	10
Recent					
Knox Co., Ind.	21	29.0	19.0	11.5	11.5
		20.5	12.0	8	8.5
Muscatine, Ia.	276	28.5	19.0	12	12
		18.0	13.0	7	8
Muscatine (Witter)		30.0	17.0	.....	.....
		30.0	15.6	.....	.....

It will be noted that the largest shells in both the fossil and recent sets are nearly equal in size and that both series grade down into typical *multilineata,* which is usually described as 25 or 21–25 mm. in greatest diameter.

It is again evident that size is not a varietal criterion in this variable species.

The remaining characters noted in the original description of "*altonensis*" are equally unreliable and variable in both fossil and modern forms.

The color-lines are said to be "apparently much less numerous." In the Helena fossil set (including imperfect specimens) 14 shells show numerous lines and narrow bands, in 6 they are faint and few, and 2 have none. This character is so variable (as shown most clearly in recent shells), even in individuals of the same set or colony, that it has no diagnostic value.

As to form, larger shells, both fossil and recent, are likely to show more gibbous whorls and deeper sutures, a more rapidly descending last whorl, and sometimes an apparently more depressed spire—all evidently chiefly due to the greater enlargement of the body whorl. All, however, are so variable that no

one, or any combination of them, is sufficiently stable to warrant a segregation.

There is, therefore, no possible consistent line of demarkation between "typical" *multilineata* and the "var. *altonensis,*" and the latter should be dropped, despite Dr. F. C. Baker's positive statement that it "is different from anything now living" (NAUTILUS **44**: 22; 1930).

Furthermore, whether any of these "varieties" are recognized or not, the fact remains that the fossil forms of this species present no characters or variations which are not duplicated in its modern representatives in the same general region, and there is no warrant for the assumption that certain "varieties" are extinct or offer any indications of a different climate. The existing variations merely point to certain diversities in local conditions such as exist today in the same region, but are in no way indicative of general climatic differences.

NEW LYMNAEIDAE FROM THE UNITED STATES AND CANADA. II. MICHIGAN, MINNESOTA, AND MONTANA

BY FRANK C. BAKER

STAGNICOLA EMARGINATA BRYANTWALKERI NOV. var. Pl. 7, Figs. 9.

Shell elongate-ovate, wide; whorls 7, rounded; sutures well impressed; spire sharply pointed, broadly conic, shorter than the aperture; body whorl rounded, bulbous; aperture roundly ovate; outer lip thin; inner lip wide, broadly reflected over the umbilical region either entirely closing the umbilicus or leaving a small chink; columella with distinct plait; parietal wall with wide callus which is sometimes raised to make the aperture continuous; color yellowish horn, spermaceti-like in some specimens; sculpture with coarse lines of growth often raised into ridges in senile specimens; spiral striae distinct; there are several raised spiral ridges on the lower part of the body whorl in some specimens.

Length	*Diameter*	*Aperture Height*	*Aperture Diameter*	
32.0 mm.	18.2 mm.	18.2 mm.	10.3 mm.	Holotype.
30.0 mm.	17.0 mm.	18.1 mm.	10.0 mm.	Paratype.
29.0 mm.	19.5 mm.	20.0 mm.	12.0 mm.	Paratype.